

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference NG01H64/P-WO	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA/416)	
International application No. PCT/EP 03/05299	International filing date (<i>day/month/year</i>) 20.05.2003	Priority date (<i>day/month/year</i>) 29.05.2002
International Patent Classification (IPC) or both national classification and IPC E21B7/28		
Applicant LATTICE INTELLECTUAL PROPERTY LTD et al.		

1.	This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2.	This REPORT consists of a total of 7 sheets, including this cover sheet. <input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT). These annexes consist of a total of 5 sheets.
3.	This report contains indications relating to the following items: <ul style="list-style-type: none"> I <input checked="" type="checkbox"/> Basis of the opinion II <input type="checkbox"/> Priority III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability IV <input type="checkbox"/> Lack of unity of invention V <input checked="" type="checkbox"/> Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement VI <input type="checkbox"/> Certain documents cited VII <input type="checkbox"/> Certain defects in the international application VIII <input type="checkbox"/> Certain observations on the international application

Date of submission of the demand 23.12.2003	Date of completion of this report 14.06.2004
Name and mailing address of the international preliminary examining authority: <div style="display: flex; align-items: center;"> <div> European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465 </div> </div>	Authorized Officer Morrish, S Telephone No. +49 89 2399-7220



**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/EP 03/05299

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, Pages

1-7 as originally filed

Claims, Numbers

1-16 received on 13.05.2004 with letter of 07.05.2004

Drawings, Sheets

1/4-4/4 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
☐ the language of publication of the international application (under Rule 48.3(b)).
☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority in written form.
☐ furnished subsequently to this Authority in computer readable form.
☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
☒ the claims, Nos.: 17,18
☐ the drawings, sheets:

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/EP 03/05299

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-16
	No: Claims	
Inventive step (IS)	Yes: Claims	1-16
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-16
	No: Claims	

2. Citations and explanations

see separate sheet

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/EP03/05299

The examination is being carried out on the **following application documents**:

Text for the Contracting States:

AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IT LI LT LU LV MC MK NL PL PT RO SE SI
SK TR

Description, pages: 1-7, as originally filed

Claims, No.: 1-16, as received on 13/05/2004, with letter of 07/05/2004

Drawings, sheets: 1/4-4/4, as originally filed

**V - Reasoned statement under Article 35(2) with regard to novelty, inventive step
or industrial applicability; citations and explanations supporting such statement**

V-1 Claims 1 to 3

The document D1: DE-A-101 32 753 which is regarded as being the closest prior art to the subject-matter of **claim 1**, discloses a method of creating a reamed hole below the surface, the method comprising the steps of (the paragraph numbers in parentheses relate to this document):

- positioning a directional drilling machine on the surface, the directional drilling machine having at least one boring stem (002-003);
- connecting **[of]** a reaming device using a dual reaming mechanism, such mechanism being driven by either a plurality of boring stems, with at least one stem concentrically located inside of another, or a single stem that uses mechanical means to differentiate torque (008), the interior section of the dual reaming mechanism having the capability of being rotated at a slower or faster revolution rate than the exterior section of the apparatus (011);
- use of the dual reaming tool to form a substantially round reamed hole that is larger than the drill string (005).

The subject-matter of **claim 1** differs from that of this known D1 in that the interior portion of the dual reaming apparatus is rotated in a clockwise rotation and the exterior portion is rotated in a counterclockwise rotation or vice versa. Therefore the subject-matter of said claim is new and as such meets the corresponding requirements of the PCT with respect to novelty.

None of the documents of the prior art specifically discloses a method of reaming a borehole whereby a dual function of cutting the soil (exterior portion) and a mixing of slurry (interior portion) is achieved by the interior and exterior portions of the apparatus being rotated in opposite directions (clockwise and counter-clockwise) and therefore it is considered that the subject-matter of **claim 1** meets the requirements of the PCT with respect to inventive step.

Claims 2 and 3 are dependent on claim 1 and as such also meet the requirements of the PCT with respect to novelty and inventive step.

V-2 Claims 4 to 6

Document D1 is also regarded as being the closest prior art to the subject-matter of **claim 4**, and discloses an apparatus consisting of (the paragraph numbers in parentheses relate to this document):

a rearward and forward end, the forward end capable of being connected to a directional boring machine, said apparatus having at least two parts, an interior portion and an exterior portion, so that said interior portion can be turned independently of said exterior portion.

The subject-matter of **claim 4** differs from that of this known D1 in that the interior portion of the dual reaming apparatus is rotated in a clockwise rotation and the exterior portion is rotated in a counterclockwise rotation or vice versa. Therefore the subject-matter of said claim is new and as such meets the corresponding requirements of the PCT with respect to novelty. As in claim 1 above, none of the existing prior art hints at an apparatus whereby the apparatus performs two functions by rotating in different directions. Therefore the subject-matter of **claim 4** also meets the requirements of the PCT with respect to inventive step.

Claims 5 and 6 are dependent on claim 4 and as such also meet the requirements of the PCT with respect to novelty and inventive step.

V-3 Claims 7 to 11

D1 is also regarded as being the closest prior art to the subject-matter of **claim 7**, and discloses a method of creating a reamed hole below the surface, the method comprising the steps of (the paragraph numbers in parentheses relate to this document):

- positioning a directional drilling machine on the surface, the directional drilling machine having at least one boring stem (002-003);
- connecting a reaming device to the at least one boring stem wherein the reaming device has a dual reaming mechanism with an interior and an exterior section wherein the interior section is rotatable independently of the exterior section (011); and
- wherein a substantially non-circular reamed hole is produced.

The subject-matter of **claim 7** differs from that of this known D1 in that the interior portion of the dual reaming apparatus is rotated in a clockwise rotation and the exterior portion is rotated in a counterclockwise rotation or vice versa. Therefore the subject-matter of said claim is new and as such meets the corresponding requirements of the PCT with respect to novelty. As in claim 1 above, none of the existing prior art hints at a method whereby two functions can be performed simultaneously by rotating the reamer interior and exterior in different directions. Therefore the subject-matter of **claim 7** also meets the requirements of the PCT with respect to inventive step.

Claims 8 to 11 are dependent on claim 7 and as such also meet the requirements of the PCT with respect to novelty and inventive step.

V-4 Claims 12 to 16

As **claims 12 to 16** relate to a general apparatus for producing a reamed hole whereby the reaming device is independently rotatable around an axis whereby the interior portion of the dual reaming apparatus is rotated in a clockwise rotation and the exterior portion is rotated in a counterclockwise rotation or vice versa, the subject-matter of said claims is new and inventive and as such meets the corresponding requirements of the PCT with respect to novelty and inventive step.

V-5 Additional Comments

Independent claims 1, 4, 7 and 12 are not in the two-part form in accordance with Rule 6.3(b) PCT, which in the present case would be appropriate, with those features known in combination from the prior art (document D1) being placed in the preamble (Rule 6.3(b)(i) PCT) and with the remaining features being included in the characterising part (Rule 6.3(b)(ii) PCT).

Said independent claims should therefore be redrafted accordingly. If, however, the applicant is of the opinion that the two-part form would be inappropriate, then reasons therefor should be provided in the letter of reply. In addition, the applicant should ensure that it is clear from the description which features of the subject-matter of said claims are already known in combination from the document D1 (see the PCT Guidelines, III-2.3a) and this document should be identified in the description (Rule 5.1(a)(ii) PCT).

It is suggested that a slightly clearer formulation of the characterising portion of independent claims 1, 4, 7 and 12 could be: "the interior portion of the dual reaming apparatus is rotated in a clockwise **direction** and the exterior portion is rotated in a counterclockwise **direction**." However, if the applicant would like to retain his original formulation, the claim could also read: "the interior portion of the dual reaming apparatus is rotated **with** a clockwise rotation and the exterior portion is rotated **with** a counterclockwise rotation."

Applicant: Lattice Intellectual Property Ltd.
Attorney's file: NG01H64/P-WO

New Claims

1. A method of creating a reamed hole below the surface, the method comprising the steps of:

positioning a directional drilling machine on the surface, the directional drilling machine having at least one boring stem;

connecting of a reaming device using a dual reaming mechanism, such mechanism being driven by either a plurality of boring stems, with at least one stem concentrically located inside of another or a single stem that uses mechanical means to differentiate torque, the interior section of the dual reaming mechanism having the capability of being rotated at a slower or faster revolution rate than the exterior section of the apparatus;

use of the dual reaming tool to form a substantially round reamed hole that is larger than the drill string; wherein

the interior portion of the dual reaming apparatus is rotated in a clockwise rotation and the exterior portion of the reaming apparatus is rotated in a counterclockwise rotation

or

the interior portion of the dual reaming apparatus is rotated in a counterclockwise rotation and the exterior portion of the reaming apparatus is rotated in a clockwise rotation.

2. The method of claim 1 where the dual reaming tool is used to form a substantially non round or irregularly shaped reamed hole larger than the drill.
3. The method of claim 1 where the interior portion is rotated at a different rate than the exterior portion by use of either a combination of at least two gears or a camshaft, said gears or camshaft used to differentiate torque provided by rotation of a connected directional boring machine drill string.

4. An apparatus consisting of:

a rearward and forward end, the forward end capable of being connected to a directional boring machine, said apparatus having at least two parts, an interior portion and an exterior portion, said interior portion that can be turned independently of said exterior portion, wherein

the interior portion of the dual reaming apparatus is rotated in a clockwise rotation and the exterior portion of the reaming apparatus is rotated in a counterclockwise rotation

or

the interior portion of the dual reaming apparatus is rotated in a counterclockwise rotation and the exterior portion of the reaming apparatus is rotated in a clockwise rotation.

5. The apparatus of claim 4 wherein the interior portion is connected by the use of a threaded connection, the exterior portion is connected by the use of a threaded connection.
6. The apparatus of claim 4 where there is at least one stabilizing wing located on the exterior portion.

7. A method of creating a reamed hole below the surface, the method comprising the steps of:-

positioning a directional drilling machine on the surface, the direction drilling machine having at least one boring stem; and

connecting a reaming device to the at least one boring stem wherein the reaming device has a dual reaming mechanism with an interior section and an exterior section wherein the interior section is rotatable independently of the exterior section, wherein a substantially non-circular reamed hole is produced, wherein

the interior portion of the dual reaming apparatus is rotated in a clockwise rotation and the exterior portion of the reaming apparatus is rotated in a counterclockwise rotation

or

the interior portion of the dual reaming apparatus is rotated in a counterclockwise rotation and the exterior portion of the reaming apparatus is rotated in a clockwise rotation.

8. A method according to claim 7, wherein the dual reaming mechanism is connected to a plurality of boring stems with at least one stem concentrically located within another.
9. A method according to claim 7, wherein the dual reaming mechanism is connected to a single boring stem and a mechanical means is provided to produce differential torque.

10. Use of the method of any of claims 7 to 9 to produce a substantially circular reamed hole.
11. Use of the method of claims 7 to 9 to produce a substantially non-circular reamed hole.
12. An apparatus for creating a reamed hole below the surface, the apparatus comprising:-

a reaming device arranged to be connected to one or more boring stems, the reaming device having an interior section and an exterior section which are rotatable independently of each other, wherein the interior section and exterior section are both rotatable about the same axis, and wherein

the interior portion of the dual reaming apparatus is rotated in a clockwise rotation and the exterior portion of the reaming apparatus is rotated in a counterclockwise rotation

or

the interior portion of the dual reaming apparatus is rotated in a counterclockwise rotation and the exterior portion of the reaming apparatus is rotated in a clockwise rotation.

13. An apparatus according to claim 12, wherein the exterior section is arranged to substantially not rotate during the creation of a reamed hole.
14. An apparatus according to claim 13, wherein the exterior section is provided with at least one outside stabilising wing to reduce rotation.

15. An apparatus according to claim 13 or claim 14, where the exterior section has a non-circular cross-section.
16. An apparatus according to claim 12, wherein the exterior section has a substantially circular cross-section.